Potential hydrophobicity of a sandy soil induced by the litter of three Mediterranean aromatic plants

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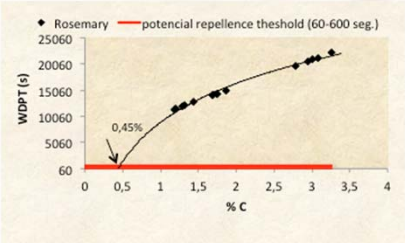
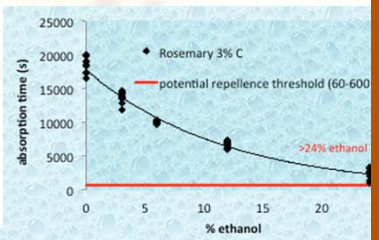
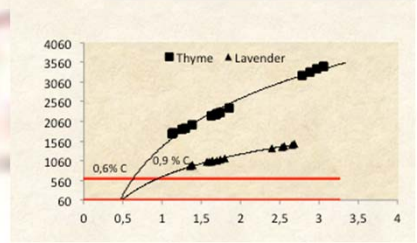
The hydrophobicity of the soil in dry Mediterranean environments has been investigated mainly in pine forests and/or in relationship to fire. There are few studies on the influence on soil hydrophobicity of different types and amounts of organic matter coming from leaves of aromatic plant species in the Mediterranean scrub.

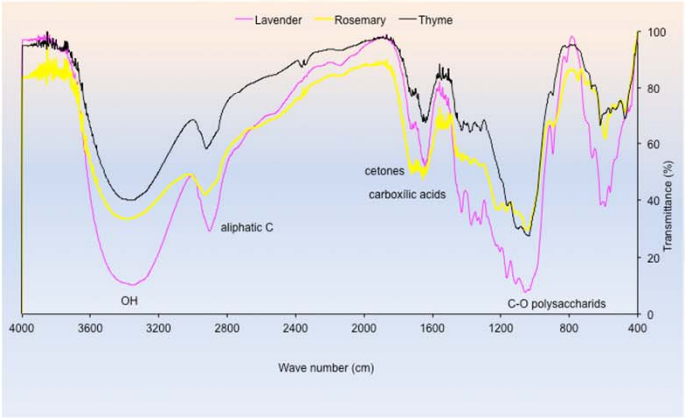
Our objective is to analyze if different types and contents of the organic matter coming from the leaves of the very abundant Mediterranean aromatic species *Rosmarinus officinalis l.*, *Thymus vulgaris l.* and *Lavandula latifolia Medic.* induce different degrees of water repellence in a coarse-textured soil typical of many slopes and degraded semiarid areas in the Valencia region.

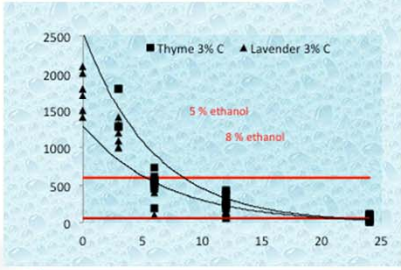
The experiment was conducted under controlled laboratory conditions in a total of eighteen pots.
Three pots of a sandy soil with low contents of carbonates and organic matter were used per treatment.
Treatments consisted on the addition of 5, 10 and 40% (by weight) of air-dried leaves of each of the aromatic species.
The soil plus the added litter mixed in the pots were subjected to alternating cycles of wetting and drying for a period several months in order to facilitate litter decomposition and incorporation to the soil. Samples of the oven-dry soil in e pot were homogenized and placed in five Petri dishes for measuring the absorption time of ten drops of water (WDPT te
The same design and procedure was used to measure the absorption time of ten drops of different ethanol concentration to 50%, MED test).











Measured absorption time depended on the type of litter added and on the organic matter content of the soil. For similar organic matter contents, absorption time increased in the order Rosemary > Thyme ≥ Lavender indicating that the litter of Rosemary plants induced more repellence to the soil due to its composition as indicated the corresponding FTIR spectra .

For concentrations of 3% organic carbon and very dry soil, the WDPT was respectively, 4, 0.6 and 0.30 h, equivalent to ethanol concentrations ranging from 24 to 8%. These results allow classifying the dry sandy soil with rosemary litter as very highly hydrophobic, and those with thyme and lavander litter from moderate to slightly hydrophobic.

Under extreme dryness, a sandy soil with similar organic matter content coming from the litter of the studied aromatic plants exhibit different degree of repellence depending on the organic matter composition. The potential repellence varies in the order Rosemary> Thyme≥ Lavender and increases with the % C content in the soil.

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